



Public Service Electric and Gas Company P.O. Box 236 Hancocks Bridge, New Jersey 08038-0236

Nuclear Business Unit

OCT 6 1997

LR-N970650

U.S. Nuclear Regulatory Commission  
Document Control Desk  
Washington, DC 20555

HOPE CREEK GENERATING STATION  
DOCKET NO. 50-354  
UNIT NO. 1  
LICENSEE EVENT REPORT NO. 97-022-00

Dear Sir:

This Licensee Event Report entitled "Engineered Safety Feature Actuation - Unplanned Manual Scram following a Relay Malfunction in the "A" Phase Main Generator Step-Up Transformer" is being submitted pursuant to the requirements of 10CFR50.73(a)(2)(iv).

Sincerely,

Mark Bezilla  
General Manager  
Hope Creek Operations

147067

RAR/tcp  
SORC Mtg. 97-067

C Distribution  
LER File

9710150006 971006  
PDR ADOCK 05000354  
S PDR



The power is in your hands.

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LR-N970650

**Attachment A**

The following items represent the commitments that the Public Service Electric and Gas Company is making to the Nuclear Regulatory Commission relative to LER 354/97-022-00:

1. The cooling fan control circuit relay was replaced in the "A", "B", and "C" Phase Main Generator Step-Up Transformers and will be retested by the completion of the current refueling outage.
2. Maintenance will continue to evaluate this event to determine if the non-safety relays should be replaced periodically based on their expected service life. This evaluation will be completed by October 31, 1997.

# CATEGORY 1

## REGULATORY INFORMATION DISTRIBUTION SYSTEM (RIDS)

ACCESSION NBR: 9710150006      DOC. DATE: 97/10/06      NOTARIZED: NO      DOCKET #  
 FACIL: 50-354 Hope Creek Nuclear Station, Unit 1, Public Service E1      05000354  
 AUTH. NAME      AUTHOR AFFILIATION  
 BEZILLA, M.      Public Service Electric & Gas Co. of New Jersey  
 RECIP. NAME      RECIPIENT AFFILIATION  
                          Document Control Branch (Document Control Desk)

SUBJECT: Forwards LER 97-022-00 re unplanned manual scram following relay malfunction in "A" phase main generator step-up transformer. Commitments made by util, encl.

DISTRIBUTION CODE: IE22T      COPIES RECEIVED: LTR 1 ENCL 1 SIZE: 2+4  
 TITLE: 50.73/50.9 Licensee Event Report (LER), Incident Rpt, etc.

NOTES: Application for permit renewal filed.

05000354

	RECIPIENT ID CODE/NAME	COPIES LTTR ENCL	RECIPIENT ID CODE/NAME	COPIES LTTR ENCL
	PD1-2 PD	1 1	JAFFE, D	1 1
INTERNAL:	AEOD/SPD/RAB	2 2	AEOD/SPD/RRAB	1 1
	FILE CENTER	1 1	NRR/DE/ECGB	1 1
	NRR/DE/EELB	1 1	NRR/DE/EMEB	1 1
	NRR/DRCH/HHFB	1 1	NRR/DRCH/HICB	1 1
	NRR/DRCH/HOLB	1 1	NRR/DRCH/HQMB	1 1
	NRR/DRPM/PECB	1 1	NRR/DSSA/SPLB	1 1
	NRR/DSSA/SRXB	1 1	RES/DET/EIB	1 1
	RGN1 FILE 01	1 1		
EXTERNAL:	L ST LOBBY WARD	1 1	LITCO BRYCE, J H	1 1
	NOAC POORE, W.	1 1	NOAC QUEENER, DS	1 1
	NRC PDR	1 1	NUDOCS FULL TXT	1 1

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FULL TEXT CONVERSION REQUIRED

TOTAL NUMBER OF COPIES REQUIRED: LTTR 24 ENCL 24

## LICENSEE EVENT REPORT (LER)

(See reverse for required number of  
digits/characters for each block)ESTIMATED BURDEN PER RESPONSE TO COMPLY WITH THIS MANDATORY INFORMATION  
COLLECTION REQUEST: 50.0 HRS. REPORTED LESSONS LEARNED ARE INCORPORATED INTO  
THE LICENSING PROCESS AND FED BACK TO INDUSTRY. FORWARD COMMENTS REGARDING  
BURDEN ESTIMATE TO THE INFORMATION AND RECORDS MANAGEMENT BRANCH (T-6 F33),  
U.S. NUCLEAR REGULATORY COMMISSION, WASHINGTON, DC 20555-0001, AND TO THE  
PAPERWORK REDUCTION PROJECT (3150-0104), OFFICE OF MANAGEMENT AND BUDGET,  
WASHINGTON, DC 20503.

FACILITY NAME (1)

Hope Creek Generating Station

DOCKET NUMBER (2)

05000354

PAGE (3)

1 OF 4

TITLE (4)

Engineered Safety Feature Actuation - Unplanned Manual Scram following a Relay Malfunction in the "A" Phase Main Generator Step-Up Transformer

EVENT DATE (5)			LER NUMBER (6)			REPORT DATE (7)			OTHER FACILITIES INVOLVED (8)	
MONTH	DAY	YEAR	YEAR	SEQUENTIAL NUMBER	REVISION NUMBER	MONTH	DAY	YEAR	FACILITY NAME	DOCKET NUMBER
09	10	97	97	022	00	10	06	97		05000
									FACILITY NAME	DOCKET NUMBER
										05000
OPERATING MODE (9)		1	THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR §: (Check one or more) (11)							
POWER LEVEL (10)		76	20.2201(b)		20.2203(a)(2)(v)		50.73(a)(2)(i)(B)		50.73(a)(2)(viii)	
			20.2203(a)(1)		20.2203(a)(3)(i)		50.73(a)(2)(ii)		50.73(a)(2)(x)	
			20.2203(a)(2)(i)		20.2203(a)(3)(ii)		50.73(a)(2)(iii)		73.71	
			20.2203(a)(2)(ii)		20.2203(a)(4)		X 50.73(a)(2)(iv)		OTHER	
			20.2203(a)(2)(iii)		50.36(c)(1)		50.73(a)(2)(v)		Specify in Abstract below or in NRC Form 366A	
			20.2203(a)(2)(iv)		50.36(c)(2)		50.73(a)(2)(vii)			

## LICENSEE CONTACT FOR THIS LER (12)

NAME

Robin Ritzman, Lead Engineer - Hope Creek Licensing

TELEPHONE NUMBER (Include Area Code)

(609) 339-1445

## COMPLETE ONE LINE FOR EACH COMPONENT FAILURE DESCRIBED IN THIS REPORT (13)

CAUSE	SYSTEM	COMPONENT	MANUFACTURER	REPORTABLE TO NRC	CAUSE	SYSTEM	COMPONENT	MANUFACTURER	REPORTABLE TO NRC
B	FK	RLY	P297	N					

## SUPPLEMENTAL REPORT EXPECTED (14)

YES

(If yes, complete EXPECTED SUBMISSION DATE).

X NO

EXPECTED  
SUBMISSION  
DATE (15)

MONTH

DAY

YEAR

## ABSTRACT (Limit to 1400 spaces, i.e., approximately 15 single-spaced typewritten lines) (16)

On 9/10/97, at 1033, a Main Transformer Trouble alarm was received in the Control Room. Equipment operators were dispatched to investigate and to determine the source of the alarm. The operators discovered the cooling fans and oil pumps on the "A" Phase Main Generator Step-Up Transformer were not operating, heard "popping" noises, and noticed a smell coming from the transformer. This information was relayed to the Control Room. Operations initiated a reactor recirculation pump runback that lowered reactor power level to 38%. At 1040, a manual scram was initiated using the mode switch. At 1041, the main generator was manually tripped. All control rods were verified to be inserted and all systems responded as expected. The loss of cooling was due to a failed relay in the transformer's control panel, which caused the oil pumps and cooling fans to trip. The apparent cause of the failed relay was internal coil heating that caused the coil temperature to exceed the capacity of the insulation. Corrective actions include replacing the relay in the "A", "B", and "C" transformers and considering preventive maintenance. On 9/10/97, at 1344, a four hour notification was made to the NRC in accordance with 10CFR50.72(b)(2)(ii). This event is being reported pursuant to 10CFR50.73(a)(2)(iv) as an Engineered Safety Feature actuation due to the unplanned manual reactor scram.

LICENSEE EVENT REPORT (LER)  
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		YEAR	SEQUENTIAL NUMBER	REVISION NUMBER	
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TEXT (If more space is required, use additional copies of NRC Form 366A) (17)

PLANT AND SYSTEM IDENTIFICATION

General Electric - Boiling Water Reactor (BWR/4)  
Main Transformer - EIIS Identifier {FK/XFMR}\*

\* Energy Industry Identification System (EIIS) codes and component function identifier codes appear as {SS/CC}.

IDENTIFICATION OF OCCURRENCE

Event Date: September 10, 1997  
Problem Report: 970910227

CONDITIONS PRIOR TO OCCURRENCE

The plant was in OPERATIONAL CONDITION 1 (POWER OPERATION), at approximately 76% of rated thermal power due to an end of cycle coastdown. There were no structures, systems, or components that were inoperable at the beginning of the event that contributed to the event.

DESCRIPTION OF OCCURRENCE

On September 10, 1997, at 1033, while operating at 76% reactor power, a Main Transformer {FK/XFMR} Trouble alarm was received in the Control Room. Equipment operators were dispatched to investigate and determine the source of the alarm. The equipment operators discovered the cooling fans and oil pumps on the "A" Phase Main Generator Step-Up Transformer were not operating. Operators also heard "popping" noises and noticed a smell coming from the transformer. This information was relayed to the Control Room. Operations made a conservative decision to shut down the reactor to protect plant equipment. Operations initiated a reactor recirculation pump runback that lowered reactor power level to 38%. At 1040, a manual scram was initiated using the mode switch. At 1041, the main generator was manually tripped in accordance with plant operating procedures. All control rods were verified to be inserted and all systems responded as expected.

On September 10, 1997, at 1344, a four hour notification was made to the NRC in accordance with 10CFR50.72(b)(2)(ii). This event is being reported pursuant to 10CFR50.73(a)(2)(iv) as an Engineered Safety Feature actuation due to the unplanned manual reactor scram.

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TEXT (If more space is required, use additional copies of NRC Form 366A) (17)

CAUSE OF OCCURRENCE

The loss of cooling was due to a failed relay in the transformer's control panel, which caused the oil pumps and cooling fans to trip. The apparent cause of the failed relay was internal coil heating that caused the coil temperature to exceed the capacity of the insulation to protect the relay. The non-safety related relay failure may be attributed to age related degradation.

PREVIOUS OCCURRENCES

On October 13, 1987, the "A" Phase Main Generator Step-Up Transformer failed catastrophically while being operated at low power. All required cooling equipment, controls and alarms appear to have functioned normally. Oil chemistry, including gas content and dielectric strength had been within normal limits. Insulation properties appear to have been acceptable. The failure mode appears to have been a sudden, internal fault within the high voltage winding preceded by possible localized breakdown of the dielectric properties of the cooling oil, which subsequently destroyed sections of the high voltage winding of the transformer. Several corrective actions were implemented as a result of this event; however, none of them could have been expected to prevent this event.

The October 13, 1987, event was not reported as an LER. Prior to the event, the plant was operating at approximately 20% power. The reactor scram signals from the Turbine Control Valve Closure were received, but the reactor did not automatically scram because these signals were not active below 30% power. Due to the low power level, the plant was shut down by a controlled shutdown rather than a reactor scram.

ASSESSMENT OF SAFETY CONSEQUENCES

No safety related equipment failed or was damaged during the course of this event. Operators manually scrammed the reactor and tripped the generator in order to prevent further damage to the transformer. All control rods inserted properly and all systems reacted to the manual scram as designed. There was no impact on public health and safety.

LICENSEE EVENT REPORT (LER)  
TEXT CONTINUATION

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TEXT (If more space is required, use additional copies of NRC Form 366A) (17)

CORRECTIVE ACTIONS

1. The oil in the "A", "B", and "C" Phase Main Generator Step-Up Transformers was sampled and tested. The testing included insulating oil gas-in-oil analysis, insulating oil temperature, insulating oil physical analysis, electrostatic charge susceptibility, and low level metals analysis. The test results were evaluated by Engineering and found to be acceptable.
2. The cooling fan control circuit relay was replaced in the "A", "B", and "C" Phase Main Generator Step-Up Transformers and will be retested by the completion of the current refueling outage.
3. Maintenance will continue to evaluate this event to determine if the non-safety relays should be replaced periodically based on their expected service life. This evaluation will be completed by October 31, 1997.